P-19

IN THE MATTER OF ORDER IN COUNCIL P.C. 2008-1092, MADE PURSUANT TO PART I OF THE *INQUIRIES ACT*: COMMISSION OF INQUIRY INTO CERTAIN ALLEGATIONS RESPECTING BUSINESS AND FINANCIAL DEALINGS BETWEEN KARLHEINZ SCHREIBER AND THE RIGHT HONOURABLE BRIAN MULRONEY

ADDITIONAL DOCUMENTS
CROSS-EXAMINATION OF GREG ALFORD

Visit with LGen R.N. Fischer

September 20, 1994

Summary of Discussion

General

Jürgen Massmann, accompanied by Jack Vance, paid an office call on the new senior ADM Materiel of DND, LGen Bob Fischer on Sept. 20, 1994.

We hoped to accomplish the following during this meeting:

a. establish that Thyssen is a professional and competent developer and builder of armoured vehicles, and a serious contender fully capable of meeting the emerging Canadian requirement for a new Armoured Personnel Carrier (APC).

b. Clear the air regarding Thyssen's interests and intentions vis à vis DND

c. Find out the current stakes of the Canadian APC Replacement project.

d. Assess the probable procurement strategy: will it be open competition or will it be a directed contract to GM?

In summary, all of these purposes were accomplished. Additionally, I assess that the foundations were laid for a good, open and friendly relationship between Massmann and Fischer (the meeting scheduled for one hour, lasted over one and one half hours). Massmann extended a personal invitation for Fischer and his staff to visit Kassel. It was also agreed that the cancelled dinner should take place (along with perhaps Reay and Addy) the next time Massmann visits Ottawa.

Main Discussion Points

Fischer made the following "positional" points during discussion:

a. he had no predetermined position vis à vis Thyssen

b. he was already generally familiar with Thyssen capabilities and with Thyssen interests in Canada

c. he had seen the TH 495 at EuroSatory and he had read the literature and seen

the video Greg Alford had forwarded to his office.

d. he was very careful to identify the operational staff as the arbiter of vehicle requirements, stressing that he saw his job as procuring the vehicle they want.

e. he showed confidence in his own engineering staff, intimated some confidence in Cindy Canizzo, and looked lost that we should think Mr. Lagueux would somehow be involved in aspects pertinent to us.

f. he intimated that he and Reay had recent discussions about us and that they were working on the same net.

The TH 495 got a quite thorough exposure during discussion (both Massmann and Fischer being vehicle engineers helped). Massmann got the chance to develop a good discussion about vehicle characteristics, in the process underlining the advantages of tracked vehicles, modularity, growth potential, protection and possible future developments, and strategic mobility. (Fischer noted "en passant" that the requirements staff seem to be dropping the essentiality for airtransportability and this afforded us a good opportunity to talk about rapid reaction, response to tasks like Rwanda, and air requirements now being identified in France and Germany.)

Regarding Canadian plans, Fischer confirmed that the APC Replacement Project is emerging quickly and that it is accurate to think of it as seeking procurement of about 1,000 units, with contracting by the end of 1995, and first production not later than 1997. He stated that the full catalogue of potential contenders had been reviewed by the staff and reduced to the more serious contenders. While not yet a "short list", the TH 495 was still on and likely to stay.

At this point, Vance asked Fischer directly: Will procurement strategy really permit open competition or will it be directed, once again to GM? This gave Fischer the opportunity to:

a. stress the need for competition

b. acknowledge that the requirement does mean a new, modern vehicle, and

c. admit that GMDD may not be capable of producing such a vehicle.

It also gave him the occasion to make what I took to be one of his most important messages: everybody must recognize the "reality of GMDD", the money the Government has already devoted to "its one centre of excellence", and, GMDD "will have to figure one way or another" in whatever procurement plan is approved.

Massmann stressed that Thyssen is completely open to a range of production options, which could include GM, and others, should the Government so wish.

Vance clarified that the two Thyssen initiatives, ie. participation in the APC Replacement Project, and developing a capacity to meet export potential, should best be viewed as two separate proposals, not necessarily dependent on each other. Fischer demonstrated some knowledge of the export initiative and some interest in the fact that present confusion about world market analysis would be clarified. (Nothing was said about CF participation, through testing. I think in retrospect we missed a chance here and should pursue it in the future if still appropriate).

Finally, Massmann led a good discussion about inter-Allied cooporation throughout the course of the meeting. It permitted an airing of the Franco/German VBM/GTK initiative, the potential for cooperation in track development, and in particular the prospect of joint CDN/GE work.

Conclusion

This was a good, useful meeting, providing a sound basis with a key player. We must plan to build on that in the near future.

Jack Vance

ILG017698/1

THYSSEN

THYSSEN BHI

1 Nov '94

7 pages total

To Marc Lalonde
Stikeman Elliott

From: G Alford

Dear Marc,

I look forward to meeting you on Wednesday at Mirabel.

As mentioned the originally planned meeting with Bruce Deacon, Industry Canada, Director General, Defence Branch, was canceled on Monday due to his being called into the "program review" process for his department. We requested alternate times but none were available.

To provide an update to our discussions with Industry Canada I send the attached meeting notes from October 11 and 20. You will recognize that these describe the events mentioned in our most recent telephone conversations.

Bottom line: in the meeting of 20 September Industry Canada promised to put on record their conclusion that the export markets described by the company last year do exist and the Government assessment concludes that our vehicle will sell successfully into that market even without the assumption of a Canadian order. However to date we have only had meetings to discuss the process by which they will attempt to verify the 4th sector of the Market forecast dealing with "unspecified Non NATO markets" and their estimate that they will need another 30 days to carry out their work.

Attached : Meeting reports for Oct. 11 and Oct. 20, 1994

3LG017825/1

JÜRGEN MASSMANN
PRESIDENT
THYSSEN BHI

SUITE 908
350 SPARKS STREET
OTTAWA, ONT., CANADA
K1R 7S8
PHONE (613) 563-3321
TELEFAX (613) 565-7618

March 8th, 1995

Hon. David Collenette
Minister of National Defence
Mgen George Pearkes Building
Ottawa, Ontario
K1A OK 2

Dear Minister,

Further to our letters of December 2 and 14, I write with respect to the Canadian APC Requirement as announced in the White Paper on Defence, December 1, 1994.

In regard to the procurement strategy for the APC project, we naturally assume that the first priority of the Government will be to acquire a vehicle which best meets the needs of the Canadian Army for a well protected and highly mobile replacement for the Inservice M 113. Secondly, we assume that given the significant capital spending associated with such a program, there will be interest on the part of the Government to acquire a product which will prove adaptable and economic in its operation over the long term, and also offer strong industrial benefits for Canada.

Thyssen Proposal

With the confirmation of the Canadian Forces APC project in the White Paper, Thyssen intends to offer the tracked TH 495 to meet this requirement. On selection of the TH 495 for the Canadian Forces APC project, Thyssen will commit to produce in Canada for both the domestic and export market, thereby placing the World Product Mandate for the TH 495 in Canada.

As you are aware, Thyssen has formally withdrawn an earlier request for R&D funding and capital assistance which had been under discussion with Industry Canada (Reference: letter to Hon. John Manley, dec. 22, 1994, copied to Hon. David Collenette and Hon. Andre Ouellet).

Thyssen, as a builder of both tracked and wheeled APCs appreciates that the Canadian Army's mixed APC fleet exists for established operational reasons. We also note that the wheeled portion of the APC Fleet includes 199 GM Bison ordered in 1989, as well as an additional 229 GM LAV Recce ordered in 1992 (delivery pending), making some 428 modern wheeled systems in the fleet. Therefore our offer of the TH 495 addresses the need to acquire a modern, highly protected, highly mobile *tracked* APC which we believe now to be the Army's most urgent priority.

There is also the possibility that the Government may see fit to split the APC requirement in such a way that both tracked TH 495 and the GM wheeled LAV would be procured. From the Thyssen perspective we understand that some 650 units are planned for the APC Replacement program, and confirm that half of that quantity would be a sufficient initial order to secure the Thyssen commitment to transfer the World Product Mandate for TH 495 to Canada, and to commence production for domestic and export requirements, delivery starting 1997.

Thyssen's willingness to cooperate with interested Canadian partners includes a number of highly qualified systems and component manufactures in all regions of Canada. Among the potential partners are: Oerlikon Aeropsace, St. Jean; GM Diesel Division, London, Computing Devices Canada, Ottawa; Delmaca, Kitchener; and Temro, Winnipeg.

Thyssen has not committed to a specific site or region for production of TH 495 in Canada, though we have carried out internal studies to conclude that there are a variety of potential sites in the established industrial regions that can support efficient and competitive operations. The Company's planning and estimating has been based on direct experience of Thyssen Group companies in Canada and additionally on commercial information gathered from a variety of industrial locations which offer an appropriate set of conditions for operations, ie:

- -established labour skills
- - necessary transportation networks
- - existing suitable and competitively valued production facilities that can be acquired and activated in the necessary timeframe.

<u>TH 495 „Off the Shelf" and Ready for 1997</u>

Thyssen development of TH 495 has reached a stage much more advanced than achievable by older product development methods.In fact, our utilization of modern design technology has already allowed us to progress to the stage of pre-series production on the vehicle. The first TH 495 was rolled out as a prototype in September 1992, and this then served as our system test platform for extensive in-Company trials, and demonstrations with potential users. The basic design was confirmed and any necessary changes were implemented for the second vehicle which was built in 1993 as the „pre-series production vehicle". The fundamentals of modular design, and the use of modern but proven components, has allowed this highly efficient rate of development required in a privately funded project. The proof of the readiness of the TH 495 is in the fact that after further tests of several thousand kilometres Company trials on the pre-series production vehicle, we then handed it over to the Malaysian Army for a sixty day intensive user test which just concluded last month. The TH 495 completed the entire test with no systems failure and achieved the highest performance approval rating from the Malaysians.

To focus on the readiness of the TH 495 for production, we estimate the necessary time from concluding an order to first unit production at 12 to 18 months. In the context of the DND requirement, delivery of the TH 495 from Canadian production is quite feasible in 1997, were a contract concluded by end of 1995.

Export Potential

With respect to the exports for TH 495, an independent market study on the export market potential was conducted in 1994 by a Government committee led by Industry Canada, with participants from Foreign Affairs and International Trade and DND. Key conclusions of that study, briefed by the committee to Thyssen are:

- At the start of the study, the Government committee was doubtful of the market defined by Thyssen for the TH 495. However, the Government's study concluded that a specific tracked light armoured vehicle market does exist in the TH 495 category, in approximately the same scale and time frame as described by the Company's projection.

- The TH 495 as a tracked vehicle, will penetrate a distinctly different market from that which can be entered by the wheeled GM LAV. As such, any market share projected for the TH 495 represents a net increase in Canada's exports.

- The Government market analysis, assuming no Canadian sale, projects the TH 495 will achieve an export market of some 2,000 units over a period reaching out some 20 years. Furthermore, the Government committee agreed that if sale of the TH 495 to Canada were to occur, early in the market cycle, the projected market share probably would increase significantly for each export market projected. A reasonable increase to the Government's 2,000 units scenario would be to increase to 4,000 units as a most likely scenario.

- Thyssen projections indicate there is a reasonable market share potential for as much as an 8,000 unit market share, but for purposes of discussion in Canada, we are prepared to base our plants viability assessment on the Government scenarios. The Company confirms that a plant is viable even at the lowest market share projected by the Government of 2,000 units.

Status of Thyssen - DND Discussions

From a technical assessment, we have been informed by your Senior ADM Materiel that the TH 495 meets all of the technical requirements of the Canadian Forces APC program. We certainly welcome that assurance, but we are now very interested to engage in the more detailed technical discussions and vehicle demonstrations which logically would be a necessary part of the Canadian Forces' further consideration of their procurement decision. To date, we have experienced only the most limited discussion with requirements staff, and most recently raised this concern with Mr. Lagueux your ADM Supply, with a request that he consider allowing a more substantial opportunity for DND officials to assess TH 495 in open technical discussions along with vehicle demonstrations.

I have written to Mr. Lagueux to formally invite a visit by DND project staff to our Thyssen Henschel facility for technical discussions and a dynamic demonstration of our TH 495 vehicle. I would be most grateful if you could see fit to provide your approval for such discussions by your officials as I am certain a visit will only be helpful in the DND process of evaluation.

In summary, Minister, I believe that the Thyssen proposal offers the best vehicle to meet the Canadian Forces APC requirement an d at the same time offers a very high industrial benefit to Canada through additional new exports in tracked APCs which, as you know, is a product area in which Canada does not presently have a producer to address this significant export market niche.

I would welcome the opportunity to expand on any area contained in this letter at the convenience of you and your officials and can best be reached through our office in Ottawa at 563.3321.

Sincerely

CC
Hon. Andre Ouellet
Hon. John Manley
Hon. Roy MacLaren

THYSSEN BHI

MEMO

TO: Jürgen Massmann
Karlheinz Schreiber
Marc Lalonde
Jack Vance

FROM: Greg Alford

TEL: 613-563-3321
FAX: 613-563-7648

DATE: April 11, 1995

SUBJECT: Collenette Letter

PAGES: 4

1. Please find attached the most recent draft of the letter for Minister Collenette.

2. The Industry Canada market survey confirms they estimate a total export market of 26,148 with a market share projected for TH 495 of 2009 units.

However, on the page titled Tracked LAV Market Forecast Summary, please see Note 7 indicating that the Government forecast figures cannot be treated as a "low" to the company forecast as a "high". I think this was put in to allow the Government an "escape route" to keep out of any discussion on "range of likely sales".

Regards,

Draft 2

April 10, 1995

Hon. David Collenette
Minister of National Defence
MGen George Pearkes Building,
101 Col By Drive
Ottawa, Ontario
K1A 0K2

Dear Minister:

While I continue to look forward to your reply to our letters of December 2 and 14 1994 and January 24 and March 8, 1995, I write again with respect to the Canadian APC requirement as announced in the White Paper on Defence December 1, 1994.

Our Company has gone to great lengths to monitor the development of the APC requirement in order to respond to the expected Request for Proposal (RFP), but so far, we have been unable to ascertain any official position of the Government with respect to the procurement procedure which will be followed. We continue to encounter strong indications that the competitive procurement process will be bypassed in favour of a "sole-sourced" order to General Motors Diesel Division (GMDD). When we challenge this possibility, we are told: "no decision has been made on the APC project, yet". Furthermore, despite our verbal and written request to the ADM Supply we have so far been unsuccessful in securing a meeting with DND officials where they will be free to discuss the technical elements of the APC requirement in a way which will allow us to make an effective response.

I respectfully request that you issue an RFP for the APC requirement with a clear definition of the technical requirements. Our company is ready to make an offer against those requirements with a technically appropriate type of vehicle at a competitive price. Such an open and transparent procurement method can only be to the advantage of Canada.

I would now like to draw your attention to situations which I believe may be causing an inaccurate assessment of Thyssen's ability to offer an effective solution to the APC requirement.

In late March, I learned that the Canadian Forces intend to accept the acquisition of more wheeled Light Armoured Vehicles (LAV) from GMDD to be acquired in response to the APC requirement. Though the Thyssen TH 495 vehicle was among the potential

solutions considered, it was eliminated for reasons which appear unfounded. This situation could have been avoided, but despite our efforts to enter into substantial discussions with requirements staff on the technical aspects of the APC requirement, we now find that they have drawn conclusions from only limited and preliminary information, and have not permitted our company to provide detailed information against specified requirements.

Among the criticisms of the TH495 is the erroneous suggestion that it is only a prototype, when in fact it is at pre-series production stage and can be ready for delivery from Canadian production within 12 to 18 months from contract conclusion. As an example of the TH495 readiness, the pre-series production vehicle has just concluded an intensive customer trial in Malaysia, qualifying highly in all aspects of its assessment. Also, there is the misleading suggestion that TH495 would be an expensive solution; but this is purely an assumption since we have not been given a chance to present a price against specified requirements. Our only discussion of price has been in a very informal budgetary estimate exercise which provided us with minimal information that suggested an intent on the part of DND to seek an APC system which would offer exceptionally high growth potential, uncompromising protection and mobility. We replied to that simple questionnaire in a manner which was reasonable, based on the information available at the time. Naturally, a more precise description of the APC requirements would allow us to refine and formalize our offer. Only then can price be fairly judged.

One of the guidelines which we have used for the Canadian APC requirement was the Outline NATO Staff Target (ONST) for a new Multi - Purpose Base Armoured Vehicle (MBAV) which was a multilateral definition of technical characteristics for a new generation of light armoured vehicles . The Canadian Forces were active participants in the MBAV study and, as the Commander of the Army stated publicly, were very influential in the final ONST based largely on the Canadian works from the Multi Role Combat Vehicle (MRCV) project. The Thyssen TH495 meets the full mission requirements of the MBAV including all required armour protection, all terrain mobility, C-130 air-portability, high growth potential, and it is "off-the -shelf" as regards its development status.

These issues can only be fully assessed through a formal evaluation of an offer again RFP or similar procurement device which will set out DND requirements and allow competitive response to be made. If the requirements of the Army are dramatically changed from that which have been described earlier, we will make the most appropriate technical offer from our entire range of capabilities which include vehicles of both tracked and wheeled designs.

Separate from the specific APC procurement discussion, we have also encountered situations where senior officials at DND, among them Mr Fowler while he was Deputy

Draft 2 3

... indicating that "there is only room for one armoured vehicle producer in ...". This seems to be supported by the indications we have received that all of the new vehicle solutions for the APC requirement are exclusively those which were proposed for construction at GMDD. However, an exclusive position for GMDD has never been enunciated to our Company by any member of the Government, either in the present or the previous administration. To the contrary, our company has continually been encouraged to bring forward our proposal for manufacturing in Canada and to remain active in Canada in anticipation of participation in the competitive procurement process for the Canadian Forces armoured vehicle requirements.

On the point of the industrial ... which will be associated with our offer against the APC requirement, we can unde... nd that is not necessarily of equal interest or priority to DND officials as it may be to the Government overall. We are quite certain that on fair evaluation it will be judged to offer a significant net increase to Canadian jobs and exports.

As we have described in previous correspondence, Industry Canada lead a committee including officials from DND and International Trade and Foreign Affairs, in an independent study which assessed the export market for tracked armoured vehicles in the TH495 category. They concluded that such a market does exist and even under the most restrictive assumptions, a market share of some 2,000 units will be won by the Thyssen TH495 from Canadian production. That study was for export markets only and assumed no sale to Canadian DND. Therefore it is fair to conclude that TH495 will not be dependent on domestic market and that answers the DND concern that Canada might be the only purchaser of the TH495.

Certainly TH495 will gain a great advantage in international markets from a first sale to the Canadian Forces and that value will be recognized through the commitment of the world product mandate for TH495 to Canada.

In addition to the confirmation of the tracked vehicle export market projected for TH495 it is important to recognize that this market represents a new market entry and a net gain in exports for Canada, and not a loss of market for GMDD in their wheeled vehicle export market.

In closing, I thank you for your consideration and look forward to participating in an open and transparent bidding process against the APC requirements.

Sincerely,
Juergen Massmann

cc: Hon Andre Ouellet
Hon Roy McLaren
Hon John Manley

THYSSEN

THYSSEN BHI

MEMO

TO: Marc Lalonde

FROM: Greg Alford

TEL: 613-563-3321
FAX: 613-563-7648

DATE: April 18, 1995

SUBJECT: Collenette Letter

PAGES: 6 + G

Attached you will find the final draft.

With regard to Malaysia, the additional reference which you suggested is accurate according to our internal lines of communications. However, until it becomes a more "official" status in Malaysia, Jürgen felt we should not risk upsetting our position there, since a Canadian inquiry for verification could attract the attention of competitors that are not yet aware of our position.

I have marked the margin to show the location of additions suggested by Karlheinz.

Please contact me with any changes or additions you may have.

Regards,

Greg

à qui était addressée la lettre de McNight.
KH ?)

18 AVR 1995

Final Draft, 18.04.95

April 18, 1995

Hon. David Collenette
Minister of National Defence
MGen George Pearkes Building,
101 Col By Drive
Ottawa, Ontario
K1A 0K2

Dear Minister:

While I continue to look forward to your reply to our letters of December 2 and 14 1994 and January 24 and March 8, 1995, I write again with respect to the Canadian APC requirement as announced in the White Paper on Defence December 1, 1994.

Our Company has gone to great lengths to monitor the development of the APC requirement in order to respond to the expected Request for Proposal (RFP), but so far, we have been unable to ascertain any official position of the Government with respect to the procurement procedure which will be followed. We continue to encounter strong indications that the competitive procurement process will be bypassed in favour of a "sole-sourced" order to General Motors Diesel Division (GMDD). When we challenge this possibility, we are told: "no decision has been made on the APC project, yet". Furthermore, despite our verbal and written requests one month ago to Mr Lagueux, your ADM Supply, we have so far been unsuccessful in securing a meeting with DND officials where they will be free to discuss the technical elements of the APC requirement in a way which will allow us to make an effective response.

I respectfully request that you issue an RFP for the APC requirement with a clear definition of the technical requirements. Our Company is ready to make an offer against those requirements with a technically appropriate type of vehicle at a competitive price. Such an open and transparent procurement method can only be to the advantage of Canada.

The previous DND Deputy Minister, Mr Fowler, and the senior Materiel staff, on more than one occasion lectured our Company on the procurement method of DND, as one ~~which must~~ always be open and competitive in order to ensure fairness and best value. The document titled "Understanding in Principle", signed between the Company and the Government September 27, 1987 ~~(copy attached)~~, carried the signatures of the then Ministers of National Defence, Atlantic Canada Opportunities Agency, and Regional

Industrial Expansion, and among other things, promised that the Minister of Defence "will consider the participation of the Company in the Light Armoured Vehicle Procurement Program...". This was further reinforced by a letter dated January 25, 1990 (copy attached), from then Defence Minister, Hon Bill McKnight, which promised our Company the opportunity to "participate in the tendering for the contract to supply such vehicles", for a minimum of five years. With the announcement of the APC replacement program in your December 1994 Defence White Paper, we are looking forward to the opportunity to participate in that procurement process as it is clearly a part of that same requirement as was referred to in the aforementioned document and letter.

In late March this year, I learned from LGen Reay that the Canadian Forces intend to accept the acquisition of more wheeled Light Armoured Vehicles (LAV) from GMDD, to be acquired in response to the APC requirement.

I was very surprised at LGen Reay's conclusion, as at a previous meeting on September 20, 1994, LGen Fischer, Sr. ADM Materiel stated that the TH 495 fulfils all Canadian requirements. I can therefore only assume that our vehicle, which was understood to be among the potential solutions being considered, was subsequently eliminated for reasons which appear to me to be unfounded.

This development could have been avoided as, notwithstanding our efforts to enter into substantive discussions with requirements staff on the technical aspects of the APC requirement, we now find that they have apparently drawn conclusions from data that was not provided in response to specific physical and performance requirements. With the limited data so far provided, the most critical of DND assessments of our vehicle could not have been concluded.

There is the suggestion that TH 495 would be an expensive solution, but this is purely an assumption since we have not been given a chance to present a price against specified requirements. We have also encountered the opinion that a tracked solution for the APC will result in fewer vehicles for the Army, but in the absence of a firm price offer against an RFP, such a conclusion cannot be reached. In fact, current studies in NATO and the German Army have determined that the acquisition cost of a modern tracked vehicle such as our TH 495, will be cheaper than a wheeled vehicle having the same mission capabilities.

The TH 495 satisfies the White Paper objective of "off-the-shelf" technology, as it is at pre-series production stage and can be ready for delivery from Canadian production within 12 to 18 months from contract conclusion. As an example of the TH 495 readiness, the pre-series production vehicle has just concluded an intensive customer trial in Malaysia, qualifying highly in all aspects of its assessment.

One of the most appropriate technical definitions of a modern APC which we have used

as a guideline for the Canadian APC requirement is the NATO definition for a new Multi - Purpose Base Armoured Vehicle (MBAV) . The Canadian Forces were active participants in the MBAV study and, as the Commander of the Army stated publicly, Canada was very influential in the requirements defined for the MBAV based largely on the Canadian work on the Multi Role Combat Vehicle (MRCV) project. The Thyssen TH 495 was designed to comply with all of the technical requirements of the MRCV program and its APC component, as they were being briefed to industry in 1992. The TH 495 meets the full mission requirements of the APC as we know them, offering all around high armour protection, NBC protection, low IR and radar signature, superior off road mobility, C-130 air-portability, high growth potential, modular design permitting low cost maintenance and adjustment to changing mission requirements, and it is "off-the -shelf" as regards its development status.

Air portability by the Hercules C-130 was an essential requirement previously identified in the Canadian outlines of the APC requirement when it was part of the MRCV program. From our assessment of the competing vehicles, we know that only the TH 495 is capable of fulfilling this in combination with all of the other previous stated performance requirements.

Among the tracked solutions considered, will be the re-armouring of the existing M113 fleet. In this option the addition of armour will result in an increase in overall vehicle weight, which then must be offset by a replacement of the engine, transmission, suspension and a variety of other adjustments necessary to regain its original power to weight ratio, which is already less than ideal. Such significant re-engineering of the M113, as is necessary to improve this very old design, will most certainly raise concerns of technical risk and hence potential cost growth. In our view, a new vehicle will offer much greater growth potential, lower operating costs, and a variety of technical advantages especially in the area of protection and mobility. As well, the industrial benefits which are secured through a new vehicle acquisition, offer much greater value to the Canadian economy in exports which would not be associated with upgrade work.

These issues can only be fully assessed through a formal evaluation of an offer against an RFP or similar procurement device which will set out DND requirements and allow a competitive response to be made. If the requirements of the Army are significantly changed from that which have been described earlier, we will make the most appropriate technical offer from our entire range of capabilities which of course includes vehicles of both tracked and wheeled designs. Both of these design groups offer modular design families of vehicles, capable of meeting every mission requirement in the light armour category.

Separate from the specific APC procurement discussion, we have also encountered situations where senior officials at DND, among them Mr. Fowler while he was Deputy Minister, suggested that there is only room for one armoured vehicle producer in Canada. This seems to be supported by the indications we have received that all of the

new vehicle solutions for the APC requirement are those which were proposed for construction at GMDD. However, an exclusive position for GMDD has never been enunciated to our Company or publicly stated as Government policy, either in the present or the previous administration. Our Company has continually been encouraged to bring forward our proposal for manufacturing in Canada and to remain active in Canada to participate in the procurement process for the Canadian Forces' armoured vehicle requirements.

KHS From an international trade perspective, I can only conclude that our request for an opportunity to participate in the Canadian APC program is consistent with the fair treatment accorded to Canadian firms such as Canadair in their sales of Challenger jets and reconnaissance drones to the German Department of Defence .

On the point of the industrial benefits which will be associated with our offer against the APC requirement, we can understand that this aspect is not necessarily of equal priority to DND officials as it may be to the Government overall. We are quite certain that on fair evaluation it will be judged to offer a significant net increase of Canadian jobs and exports.

As we have described in previous correspondence, Industry Canada led a committee including officials from DND and International Trade and Foreign Affairs, in an independent study which assessed the export market for tracked armoured vehicles in the TH 495 category. They concluded that such a market does exist and even under the most restrictive assumptions, a market share of some 2,000 units will be won by the Thyssen TH 495 from Canadian production. That study was for export markets only and assumed no sale to Canadian DND. When asked to consider an export market scenario where an initial order was secured in Canada, it was agreed this would have a very positive affect on the export market "win probabilities", perhaps as much as doubling the export market share forecast. Therefore it is fair to conclude that TH 495 will not be dependent solely on the domestic market and that should allay DND concerns that Canada would be the only purchaser of the TH 495.

KHS Certainly TH 495 will gain a great advantage in international markets from a sale to the Canadian Forces, and that value will be recognized through the commitment of the world product mandate for TH 495 to Canada. This association would be most positive for a made-in-Canada TH 495 armoured vehicle since most markets presently give priority in their materiel decisions to equipment that is suitable for peacekeeping assignments. The economic return for Canada from exports of peacekeeping equipment such as the TH 495 will be very appropriate, given the constant leadership role of Canada since the very beginning U.N. peacekeeping missions.

In addition to the confirmation of the tracked vehicle export market projected for TH 495, it is important to recognize that this market represents substantial gain in industrial benefit for Canada through a new product, in a vehicle class not presently

produced in Canada and therefore a net gain in exports, not a loss of market for an established producer. Moreover, it is unlikely that an established manufacturer would find it profitable to switch production to tracked vehicles at an existing facility. In this sense the Thyssen facility would be complimentary to existing facilities.

In conclusion, I would like to emphasize that Thyssen remains interested not only in DND's APC procurement, and in building on our already substantial presence in Canada. We see Canada not only as an important market for our products but also as a base for worldwide sales which we confidently predict will run in a range of $10 Billion over the next fifteen to twenty years.

I look forward to speaking with you further on Thyssen's interest in the APC program and our desire to expand in Canada. In this regard, thank you for your consideration and look forward to participating in the upcoming APC competition.

Sincerely,

Juergen Massmann
President

cc: Rt. Hon. Jean Chretien
Hon Andre Ouellet
Hon Roy McLaren
Hon John Manley

UNDERSTANDING IN PRINCIPLE

This document signed this 17 day of September, 1988, between:

THE GOVERNMENT OF CANADA, as represented by:

i) the Minister responsible for the Atlantic Canada Opportunities Agency (hereinafter called "the ACOA Minister"),

ii) the Minister of Regional Industrial Expansion (hereinafter called "the DRIE Minister"), and

iii) the Minister of National Defence (hereinafter called "the National Defence Minister); and

BEAR HEAD INDUSTRIES LTD., a company incorporated under the laws of Nova Scotia, a subsidiary which is one hundred (100%) percent owned by Thyssen Industries A.G. of the Federal Republic of Germany (hereinafter called "the Company").

WHEREAS the Government of Canada desires to foster the economic expansion and industrial development of Cape Breton;

WHEREAS the Company must have in place a North American heavy-industry manufacturing facility on an urgent basis, and desires to establish such a facility in the Bear Head peninsula region of Cape Breton;

WHEREAS the Government of Canada recognizes that the proposed Bear Head facility represents an important economic development and diversification of the industrial base of Cape Breton; and

WHEREAS the Company is preparing financial details on its proposal, to meet the information requirements of the Government's established regional development capital contribution, and other assistance programs.

1. In accordance with this Understanding in Principle, the Company shall establish a diversified heavy-industry manufacturing facility in the Bear Head region of Cape Breton, Nova Scotia, which will:

(a) create in Cape Breton a new and diversified activity in the Canadian civilian and defence industrial base, with access to the North American defence markets, under the Canada U.S. Defence Production Sharing Agreement;

(b) transfer to the facility, all technology necessary for the construction of light armoured vehicles, and other heavy-industry products;

(c) source its requirements co-operatively from, and implement arrangements for joint-venture activities with, the Lavalin (UTDC) heavy-industry facility, in Trenton, Nova Scotia, in accordance with existing agreements between the Company and Lavalin;

(d) to the greatest extent possible, source its requirements from, and promote the establishment of, small business enterprises located in Atlantic Canada;

(e) implement arrangements for co-production with Krauss Maffei, in accordance with existing agreements between the Company and Krauss Maffei, if, under the Main Battle Tank project envisaged by the Government of Canada, Krauss Maffei is selected to manufacture Canada's replacement battlefield tanks; and

(f) employ a minimum of 500 people on a permanent, full-time basis and, where necessary, train these individuals in required skills and knowledge, utilizing, where appropriate, local educational facilities.

2. In accordance with this Understanding in Principle, the Government of Canada, in order to facilitate the establishment of the Company's heavy-industry manufacturing activity in Cape Breton, will:

(a) enter into negotiations with the Province of Nova Scotia, in accordance with existing letters to the Company from the Premier of Nova Scotia, to put in place financial arrangements for the co-funding of required physical infrastructure, up to a maximum value of $27 million, and to use the Strait of Canso Industrial Development Subagreement as a source of funding;

(b) entertain an application by the Company to the Minister of National Revenue for assistance based on eligible project costs up to a maximum of $68 million, under the provisions of the Cape Breton Investment Tax Credit, in accordance with the formal application for such assistance filed by the Company prior to June 30, 1988;

(c) entertain an application by the Company to the Minister of National Revenue for duty remission on the importation of machinery, parts, and components for the manufacturing of vehicles, under the Machinery and Equipment Tariff Program, consistent with this program at the time of such importation; and

(d) entertain an application by the Company to the Minister of Employment and Immigration for government participatory funding, for initial employee training.

3. In recognition of the need to proceed urgently, the Government of Canada and the Company agree to adopt a two-phased approach to the establishment of the Bear Head facility.

PHASE I

4. The Government of Canada and Company agree that in Phase I, the respective parties will undertake the following:

(a) the Company:

(i) the Company will proceed forthwith with the construction of an initial plant, as described in the document submitted to ACOA in March 1988, requiring an initial capital investment of $58 million, to manufacture defence products for the North American markets;

(ii) the Company will have submitted a formal application to Enterprise Cape Breton, in advance of June 30, 1988, seeking assistance under the Cape Breton Investment Tax Credit (CBITC); and

(iii) the Company will provide by October 21, 1988, financial and other details associated with Phase I, and, in the shortest time possible thereafter, the remaining information required in order to qualify for assistance under the Defence Industries Productivity Program (DIPP), and other government assistance programs, under which funding is sought.

(b) the Government of Canada:

(i) the ACOA Minister, and the DRIE Minister, will consider assistance to the Company, up to a maximum of fifty (50) percent of eligible project costs, under programs delivered by Enterprise Cape Breton, consistent with these programs at the time the Bear Head project becomes eligible for such assistance.

(ii) The Minister of National Defence, in recognition of the excellent international reputation for quality and performance earned by Thyssen Industries A.G. in the military vehicle sector, and in the context of the major acquisition program for the upgrading of the Canadian Forces envisaged in the Defence White Paper, will consider the participation of the Company in the Light Armoured Vehicle Procurement Program, envisaged to occur in the early-to-mid 1990's, provided the Company:

(a) develops, designs, and manufactures, in its Cape Breton facility, these vehicles from its entire technology range according to the operational requirements of the Government of Canada,

(b) meets the Government's requirements for quality, delivery, and logistic support, including personnel training,

(c) delivers and performs at internationally competitive prices, and

(d) provides acceptable regional and industrial benefits; and

(iii) the DRIE Minister will consider capital establishment assistance to the Company, under the Defence Industries Productivity Program (DIPP), consistent with this program at the time the Bear Head project becomes eligible for such assistance.

PHASE II

5. The Government of Canada and Company further agree that in Phase II, the respective parties will undertake the following:

(a) the Company:

(i) the Company will proceed not later than twelve (12) months after the commencement of production under Phase I, with diversification into heavy civilian manufacturing production targeted at Canadian and international markets;

(ii) the Company will provide within six (6) months after the commencement of production under Phase I, financial details including product and market projections associated with Phase II; and

(iii) should Phase II not be proceeded with, the Company will reimburse the Government of Canada for:

(1) assistance as is provided by the ACOA and DRIE Ministers under paragraph 4 b(i) above, and

(2) a portion, to be determined in subsequent negotiations, of the infrastructure assistance provided under paragraph 2 (a) above, in the event that the planned employment level of 400 people for Phase I is not sustained for 5 years.

(b) the Government of Canada:

the ACOA Minister, and the DRIE Minister, will consider assistance to the Company, under established regional and industrial development programming, consistent with such programs at the time the Bear Head project becomes eligible for such assistance.

6. This Understanding in Principle may be complemented by future Memoranda of Understanding.

7. The understandings in principle set out in this Understanding in Principle do not create any enforceable, legal or equitable rights, nor obligations, but merely serve to document the:

(a) parameters that have been set; and

(b) areas on which discussions have been held, and understandings in principle reached.

Further clarifying negotiations and the requisite approval from all appropriate parties (including without limiting the foregoing, Treasury Board, and the Board of Directors of Bear Head Industries Ltd.) are needed before contractual documentation can be entered into.

THE GOVERNMENT OF CANADA

Minister responsible for the Atlantic Canada Opportunities Agency

Minister of Regional Industrial Expansion

Minister of National Defence

BEAR HEAD INDUSTRIES LIMITED

Mr. Karlheinz Schreiber, Chairman

JÜRGEN MASSMANN
PRESIDENT
THYSSEN BHI

SUITE 908
350 SPARKS STREET
OTTAWA, ONT., CANADA
K1R 7S8
PHONE (613) 563-3321
TELEFAX (613) 563-7648

April 21, 1995

Hon. David Collenette
Minister of National Defence
MGen George Pearkes Building
101 Col. By Drive
Ottawa, Ontario
K1A 0K2

Dear Minister:

While I continue to look forward to your reply to our letters of December 2 and 14, 1994 and January 24 and March 8, 1995, I write again with respect to the Canadian APC requirement as announced in the White Paper on Defence December 1, 1994.

Our Company has gone to great lengths to monitor the development of the APC requirement in order to respond to the expected Request for Proposal (RFP), but so far, we have been unable to ascertain any official position of the Government with respect to the procurement procedure which will be followed. We continue to encounter strong indications that the competitive procurement process will be bypassed in favour of a „sole-sourced" order to General Motors Diesel Division (GMDD). When we challenge this possibility, we are told: „no decision has been made on the APC project, yet". Furthermore, despite our verbal and written requests one month ago to Mr. Lagueux, your ADM Supply, we have so far been unsuccessful in securing a meeting with DND officials where they will be free to discuss the technical elements of the APC requirement in a way which will allow us to make an effective response.

I respectfully request that you issue an RFP for the APC requirement with a clear definition of the technical requirements. Our Company is ready to make an offer against those requirements with a technically appropriate type of vehicle at a competitive price. Such an open and transparent procurement method can only be to the advantage of Canada.

The previous DND Deputy Minister, Mr. Fowler, and the senior Materiel staff, on more than one occasion lectured our Company on the procurement method of DND, as one which must always be open and competitive in order to ensure fairness and best value. The document entitled „Understanding in Principle", signed between the Company and the Government September 27, 1988, carried the signatures of the then Ministers of National Defence, Atlantic Canada Opportunities Agency, and Regional Industrial Expansion, and among other things, promised that the Minister of Defence „will consider the participation of the Company in the Light Armoured Vehicle Procurement Program ...". Moreover, in a letter dated January 23, 1990, the then Defence Minister gave the undertaking that our Company would have the opportunity to „participate in the tendering for the contract to supply such vehicles", for a

minimum of five years. With the announcement of the APC replacement program in your December 1994 Defence White Paper, we are looking forward to the opportunity to participate in that procurement process as it is clearly a part of that same requirement as was referred to in the aforementioned document and letter.

In late March this year, I learned from LGen Reay that the Canadian Forces intend to accept the acquisition of more wheeled Light Armoured Vehicles (LAV) from GMDD, to be acquired in response to the APC requirement.

I was very surprised at LGen Reay's conclusion, as at a previous meeting on September 20, 1994, LGen Fischer, Sr. ADM Materiel stated that the TH 495 fulfills all Canadian requirements. I can therefore only assume that our vehicle, which was understood to be among the potential solutions being considered, was subsequently eliminated for reasons which appear to me to be unfounded.

This development could have been avoided as, notwithstanding our efforts to enter into substantial discussions with requirements staff on the technical aspects of the APC requirement, we now find that they have apparently drawn conclusions from data that was not provided in response to specific physical and performance requirements. With the limited data so far provided, the most critical of DND assessments of our vehicle could not have been concluded.

There is the suggestion that TH 495 would be an expensive solution, but this is purely an assumption since we have not been given a chance to present a price against specified requirements. We have also encountered the opinion that a tracked solution for the APC will result in fewer vehicles for the Army, but in the absence of a firm price offer against an RFP, such a conclusion cannot be reached. In fact, current studies in NATO and the German Army have determined that the acquisition cost of a modern tracked vehicle such as our TH 495, will be cheaper than a wheeled vehicle having the same mission capabilities.

The TH 495 satisfies the White Paper objective of „off-the-shelf" technology, as it is at pre-series production stage and can be ready for delivery from Canadian production within 12 to 18 months from contract conclusion. As an example of the TH 495 readiness, the pre-series production vehicle has just concluded an intensive customer trial in Malaysia, qualifying highly in all aspects of its assessment.

One of the most appropriate technical definitions of a modern APC which we have used as a guideline for the Canadian APC requirement is the NATO definition for a new Multi-Purpose Base Armoured Vehicle (MBAV). The Canadian Forces were active participants in the MBAV study and, as the Commander of the Army stated publicly, Canada was very influential in the requirements defined for the MBAV based largely on the Canadian work from the Multi Role Combat Vehicle (MRCV) project. The Thyssen TH 495 was designed to comply with all of the technical requirements of the MRCV program and its APC component, as they were being briefed to industry in 1992. The TH 495 meets the full mission requirements of the APC as we know them, offering all around high armour protection, NBC protection, low IR and radar signature, superior off-road mobility, C-130 air-portability, high growth potential, modular design permitting low cost maintenance and adjustment to changing mission requirements, and it is „off-the-shelf" as regards its development status.

Air portability by the Hercules C-130 was an essential requirement previously identified in the Canadian outlines of the APC requirement when it was part of the MRCV program. From our

assessment of the competing vehicles, we know that only the TH 495 is capable of fulfilling this in combination with all of the other previous stated performance requirements.

Among the tracked solutions considered will be the up-armouring of the existing M113 fleet. In this option the addition of armour will result in an increase in overall vehicle weight, which then must be offset by a replacement of the engine, transmission, suspension and a variety of other adjustments necessary to regain its original power to weight ratio, which is already less than ideal. Such significant re-engineering of the M113, as is necessary to improve this very old design, will most certainly raise concerns of technical risk and hence potential cost growth. In our view, a new vehicle will offer much greater growth potential, lower operating costs, and a variety of technical advantages especially in the area of protection and mobility. As well, the industrial benefits which are secured through a new vehicle acquisition, offer much greater value to the Canadian economy in exports which would not be associated with upgrade work.

These issues can only be fully assessed through a formal evaluation of an offer against an RFP or similar procurement device which will set out DND requirements and allow a competitive response to be made. If the requirements of the Army are significantly changed from that which have been described earlier, we will make the most appropriate technical offer from our entire range of capabilities, which of course includes vehicles of both tracked and wheeled designs. Both of these design groups offer modular design families of vehicles, capable of meeting every mission requirement in the light armour category.

We have received indications that the new vehicle solutions for the APC requirement are exclusively those which were proposed for construction at GMDD. However, an exclusive position for GMDD has never been enunciated to our Company or publicly stated as Government policy, either in the present or the previous administration. Our Company has continually been encouraged to bring forward our proposal for manufacturing in Canada and to remain active in Canada to participate in the procurement process for the Canadian Forces' armoured vehicle requirements.

From an international trade perspective, I can only conclude that our request for an opportunity to participate in the Canadian APC program is consistent with the fair treatment accorded to Canadian firms such as Canadair in their sales of Challenger jets and reconnaissance drones to the German Department of Defence.

On the point of the industrial benefits which will be associated with our offer against the APC requirement, we can understand that this aspect is not necessarily of equal priority to DND officials as it may be to the Government overall. We are quite certain that on fair evaluation it will be judged to offer a significant net increase of Canadian jobs and exports.

As we have described in previous correspondence, Industry Canada led a committee including officials from DND and International Trade and Foreign Affairs, in an independent study which assessed the export market for tracked armoured vehicles in the TH 495 category. They concluded that such a market does exist and even under the most restrictive assumptions, a market share of some 2,000 units will be won by the Thyssen TH 495 from Canadian production. That study was for export markets only and assumed no sale to Canadian DND. When asked to consider an export market scenario where an initial order was secured in Canada, it was agreed this would have a very positive effect on the export market „win probabilities", perhaps as much as doubling the export market share forecast. Therefore it is fair to conclude that TH 495 will not be dependent solely on the domestic market and that should allay DND concerns that Canada would be the only purchaser of the TH 495.

Certainly TH 495 will gain a great advantage in international markets from a sale to the Canadian Forces and that value will be recognised through the commitment of the world product mandate for TH 495 to Canada.This association would be most positive for a made in Canada TH 495 armoured vehicle since most markets presently give priority in their materiel decisions to equipment that is suitable for peacekeeping assignments. The economic return for Canada from exports of peacekeeping equipment such as the TH 495 will be very appropriate, given the constant leadership role of Canada since the very beginning of U.N. peacekeeping missions.

In addition to the confirmation of the tracked vehicle export market projected for TH 495, it is important to recognize that this market represents substantial gain in industrial benefit for Canada through a new product, in a vehicle class not presently produced in Canada and therefore a net gain in exports, not a loss of market for an established producer. Moreover, it is unlikely that an established manufacturer would find it profitable to switch production to tracked vehicles at an existing facility. In this sense the Thyssen facility would be complimentary to existing facilities.

In conclusion, I would like to emphasize that Thyssen remains interested not only in DND's APC procurement, and in building on our already substantial presence in Canada. We see Canada not only as an important market for our products but also as a base for worldwide sales which we confidently predict will run in a range of $ 10 Billion over the next 15 to 20 years.

I look forward to speaking with you further on Thyssen's interest in the APC program and our desire to expand in Canada. In this regard, thank you for your consideration and I look forward to participating in the upcoming APC competition.

Sincerely,

Jürgen Massmann
President

cc: Rt. Hon. Jean Chretien
Hon David Dingwall
Hon John Manley
Hon Roy McLaren
Hon Andre Ouellet

THYSSEN BHI

Suite 908, 360 Sparks Street, Ottawa, Ontario, Canada K1R 7S8
Telephone: (613) 563-3321 Telefax: (613) 563-7646

January 31, 1995

Marc Lalonde
Stikeman, Elliott
Montreal

Dear Marc:

Attached is a recent pair of articles appearing in Vanguard magazine, a new publication covering defence issues.

The tone of the 1st article (pp. 16-19) suggests a competitive acquisition process for the APC project.

The second article (pp. 22-27) is very well written and argues for good equipment, specifically "a well armoured fast tracked vehicle" (p. 26) for the new APC.

Companies Line Up for APC Competition

By Laurie Watson

November's Defence White Paper paves the way for the army to get new armoured personnel carriers (APCs).

But the competition to supply the new battle taxis for the infantry has been underway unofficially for ...s.

According to the Paper, Canada needs to modernize its APC fleet to operate effectively in the combat conditions encountered in today's UN and other multilateral missions. It sets out a two-part program that would involve upgrading some of the existing APCs and adding new ones, with delivery starting in 1997.

The 199 relatively new eight-wheeled Bisons, built by General Motors (GM) and delivered in 1991 and 1992, are to be kept in service. These include 149 of the APC variant which are being used for militia training.

The purchase of new APCs is long overdue for the Canadian military. Canada's existing APCs, the tracked M113A2 and the wheeled Grizzly, are first generation systems and inadequate in terms of firepower and protection.

More than 10 years ago, Canada's allies and former adversaries began introducing third-generation armoured personnel carriers—called infantry fighting vehicles—such as the Bradley (U.S.), the Warrior (U.K.) and the BMP3 (former Soviet Union). Development of fourth generation vehicles has been underway for several years.

There is considerable Canadian public support for the APC project. One industry observer told *Vanguard* it was the first time in his experience that the public has fully supported such a defence procurement program.

Part of the public's attitude can be attributed to the incidents earlier this year in Somalia and the former Yugoslavia in which Canadian soldiers in M113s and Grizzlies were killed or injured by mines and anti-tank weapons. These incidents clearly underscored the need for more heavily armoured vehicles.

According to the Department of National Defence (DND), the APC project office was established in January, 1994. Defence planners have already completed a preliminary review of all major APC manufacturers in the world, including those located in Canada, Sweden, France, Germany and the United States.

Unlike the Canadian Navy's frigate program, however, DND has restricted its search to something off-the-shelf, rather than creating a new vehicle. "We want to buy a vehicle that already exists," said a DND spokesperson. "We don't want to buy a turret from one vehicle and put it over the hull of another." DND also is considering whether to equip the APCs with 19 mm or 14 mm guns.

Sources told *Vanguard* that the army has already specified an "infantry taxi", capable of transporting a seven or eight man infantry section around the battlefield. When the taxi arrives at its destination, the crew dismounts, leaving behind the driver and gunner.

The crew commander, who will ride in the rear section with the troops, will either exit or remain behind in the turret. Other sources say the army really wants a minimum of a 25 mm gun.

Manufacturers who have expressed an interest in the APC program include DEW Engineering (Mobile Vehicle Tactical Light); Hagglunds Vehicle AB of Sweden (CV90 series Infantry Fighting Vehicle); GM of Canada (Light Armoured Vehicle); and Thyssen Henschel Gmbh of Germany (TH495). Steyr-Daimler-Puch/Santa Barbara is also said to be interested in the competition and may submit a proposal for the ASCOD infantry fighting vehicle.

Already, a debate is mounting over what constitutes "off-the-shelf".

In a recent address to members of the Canadian Defence Preparedness Association, Lt. Gen. Robert Fischer, senior Assistant Deputy Minister of Materiel, said that "off-the-shelf" should not be restricted to "off the production line" or "in the warehouse", but could include prototypes.

Selection of a prototype, however, might leave the government open to criticism for purchasing a vehicle that is not yet proven.

Wheeled vehicles, of course, are faster, can keep pace with convoys, and demand less maintenance. Although tracked vehicles are more costly to maintain, they travel through mud, sand and snow without bogging down as often as wheeled vehicles. Also, tracked vehicles can generally support heavier armour.

While there is a trade-off, clearly, a modern and well-equipped army needs both.

Since the oldest APCs in the army's fleet are the tracked M113A2s built by FMC Corporation - many deliv-

ered more than 20 years ago - newer tracked vehicles would seem logical. But that choice would rule out an upgraded version of the wheeled Light Armoured Vehicle manufactured by GM.

The final decision will depend on the perceived environment the forces are most likely to encounter internationally. For instance, soldiers serving in Bosnia have been unable to access some of their more remote Observation Posts because wheeled APCs couldn't get over the ground, even when they were equipped with chains.

There are other important performance considerations, too.

The APC must fit the forces' multi-purpose combat capability. It needs sufficient firepower and armour to protect forces engaged in the Bosnia-type peacemaking and in general combat operations, such as the Gulf War.

A low profile also is important, so that the troops aren't an obvious target, as is a low centre of gravity, in order to maintain stability.

Finally, in an era where international commitments involve many nations working together, inter-operability of equipment is important. Canada's new APC should be in use in other NATO countries.

Some bidders are concerned that the government has already decided what to buy, and the decision may not have the army's best interests at heart. For instance, DND has already decided to purchase APCs rather than full-bore infantry fighting vehicles which would offer the same mobility as tanks, superior fire power and better protection than most APC configurations.

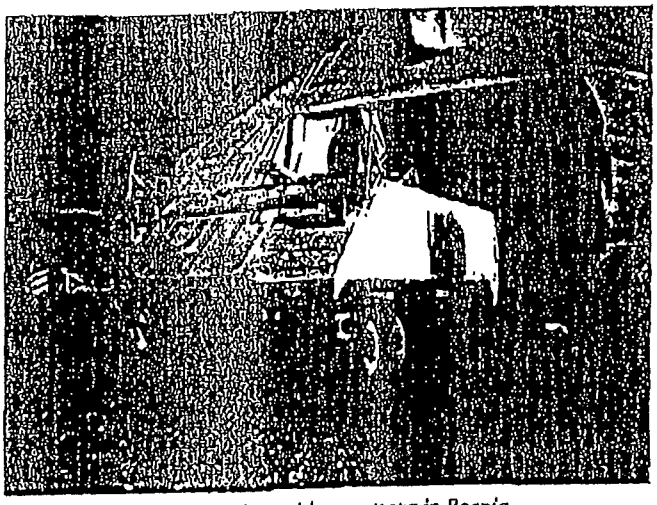
The main reason for the decision to buy minimalist APCs is cost. With a super-stringent budget due in February, there is little public support for the extra expense of a more heavily armoured vehicle. "It's the very least they can get away with," grumbled one analyst. "DND will buy new wheeled APCs, and update the old tracked ones."

According to the analyst, wheeled vehicles have definite limitations, although they are more suitable for training the militia in Canada. And, in traditional peacekeeping operations, they are more economical to operate.

"But for combat operations, you need tracked vehicles because they can carry better armour and their cross-country capability is far superior."

Another source close to DND says "a lot of minds have been made up for a long time. There's a real blitz to pick up 200 LAVs from GM and go with the easiest rebuild of the M113s."

The source said also there's also a concern over DND's "behind-the-scenes" policy regarding off-the-shelf vehicles. "When you come right down to it, off-the-shelf in Canada gets the nod over off-the-shelf offshore," he said.



M-113 getting add-on armour in Bosnia

The LAVs are serious weapons. For example, the U.S. Marine Corps purchased 800 of these vehicles and used them in Somalia with good results. The reconnaissance variant is available with a chain gun and an extendable observation mast that includes low-light television, and a thermal imager.

According to DEW Engineering, which has proposed refurbishing the M113s, the cost of such a plan would be 60 per cent of buying new Mobile Vehicle Tactical Light units. (DEW's proposal also includes buying new MTVLs.)

Sources said that in a recent competition Hagglund's CV90 was aggressively priced at $1.6 million U.S. each, while the 200 LAV "recce" vehicles being supplied to the Canadian Forces carry a total price tag of $800 million.

The following manufacturers have expressed an interest in the APC program:

Light Armoured Vehicle (LAV)

Manufacturer: General Motors of Canada

GM is having a highly successful run with its LAV program. The original armoured vehicle was designed and developed by the Swiss company MOWAG. Between 1979 and 1981, it supplied the Canadian Forces with 491 vehicles based on the MOWAG design.

In the early 1980s, it developed an eight-wheel light assault version, called the LAV-25, for the U.S. Marine Corps. This version later formed the basis for the Bison armoured personnel carrier.

The Bison's turret is replaced with a raised commander's cupola with five M17 periscopes. An externally-mounted 7.62 mm machine gun is fitted to the immediate rear of the driver's station at the front left side of the hull. The hull seats a driver, commander and nine passengers facing inwards, while the troop compartment contains a cargo hatch and two smaller hatches. The rear ramp incorporates a door. Cost of the 199 armoured vehicles, which completed delivery in 1992, was $100 million.

Next year, our Forces will begin taking delivery of a reconnaissance version of the LAV-25 to replace the

Lynx. It will be equipped with an integrated surveillance suite and will [illegible] in both a reconnaissance and a su[illegible]llance role.

Bill Pettipas, Director of Programs and Marketing for GM Canada, says DND has asked GM about the possibility of it meeting the requirements.

"The LAVs are 1994 editions," he says. "We just keep inserting the latest technology. Most of it is gadgetry. The chassis is the least expensive part of the product."

Since the LAV was first developed, Pettipas adds, GM has built over 20 different variants of the chassis. "It keeps changing and improving. You add armour protection, try to get more fuel efficient operations, and add better tires."

For the new APCs, GM would likely collaborate with another company to supply the armour, but [illegible]nstall it themselves. "Essentially, additional protection is a matter of adding steel armour, or ceramic-type armour. You get into the issue of affordability and weight of the chassis. Do you have to boost the horsepower to maintain mobility. If you demand absolute armour protection, you have to get a tank," he says.

Mobile Vehicle Tactical Light (MTVL)

Manufacturer: DEW Engineering and Development Limited of Ottawa and U.S.-based United Defense LP

The two partners are proposing a two-part program that would convert the existing M113 family to Mobile Vehicle Tactical Light (MTVL) units and provide new MTVLs.

The M113, of which there are [illegible] Canada, were first procured [illegible] years ago. They are powered by a 215 hp Detroit Diesel 6V-53 engine, considered too light for today's advances in add-on armour and weapons packages.

DEW sees its proposal as a way to extend the life of the M113s well into the 21st century. DEW would set up a facility in Chatham, New Brunswick, to convert existing M113s into MTVLs. The M113s would be inspected, disassembled and fitted with a new six road-wheel hull section that would add 870 mm to the vehicle's overall length. The power train would be beefed up with a 350 engine and transmission. The new MTVLs would also be assembled at Chatham.

MTVL Proposed by DEW Engineering

DEW claims the measures would improve cross-country mobility by 50 per cent and volume and payload capacity by 30 per cent over the existing M113. The hull with add-on armour kit will greatly exceed the requirement of armour protection against a 14.5 mm AP round at 500 metres throughout 360 degrees and shield the effects of CE weapons. Armour over the front arc would provide protection against penetration from 30 mm projectiles.

The M113s would carry eight combat-equipped soldiers plus a crew of three. DEW has proposed fitting them with a Sharpshoot one-man turret system that allows the gunner to fire while the crew commander independently commands and controls. However, a selection of one and two man turrets is available.

The refurbished M113 would be C130 air transportable.

With a power-to-weight ratio of 24.1 hp/ton compared to the 16.7 hp/ton of the M113A2, the refurbished M113s would have a rapid acceleration of 0 to 48 km/h in 12.4 seconds, compared to 28.2 seconds for the existing M113s. Its top speed would be 71 km/h, compared to 66 km/h for the existing M113s.

The MTVL is the only aluminum-hull configuration being put forward by defence manufacturers. But Howie Byer, senior program manager for DEW Engineering, says the refurbishment would extend the life of the M113 "indefinitely. It could be a 30-year old hull, but it would be as good as a brand new hull. Plus you're adding fully refurbished or new components to the hull so the vehicle coming off the line is as good as a brand new vehicle at a fraction of the cost." Byer says it's a myth that the M113 has reached the end of its useful service life.

A 1993 NATO Industrial Advisory Group recommended hulls of the new generation of multi-purpose armoured vehicles be constructed of aluminum, with a contact spall lining and add-on armour.

Bye sees the MTVL as an affordable, cost effective sensible solution to the CAF's requirement for modern

Hagglunds CV90 series Infantry Fighting Vehicle

Manufacturer: Hagglunds Vehicle AB, Sweden

Hagglund's CV90 infantry fighting vehicle is part of the CV90 series, which was developed during the mid-1980s by Hagglund for use by the Swedish Army in its northern opera-

tions. All three versions carry a crew of three, with up to 8 soldiers in the rear compartment.

The Norwegian Army announced the first export order for the CV90 family earlier this year to replace its M113A1 APC with the CV9030. Norwegian trials involved the CV9030, the ASCOD from Steyr-Daimler-Puch/Santa Barbara and United Defense's M2A2 Bradley. Norway had earlier rejected the German Thyssen Henschel TH496IF and the British-made Warrior.

Each of the three infantry fighting vehicles in the CV90 family features all-welded steel construction on the hull, with a Bofors' power-operated, two-man turret. Weapons range from a 2 mm McDonnell Douglas Bushmaster or Mauser MK 25 mm Model E canon on the C9025 to a 40 mm Bofors L/70 cannon on the CV9040.

The combat vehicle is powered by a Scania DS14 606-hp diesel engine coupled with a Perkins X300-5 fully automatic transmission. With a power-to-weight ratio of 18.9 hp/ton, the vehicles accelerate from 0 to 30 km/h in 7 seconds. It has a maximum forward speed of 70 km/h. The steel hull protects against up to 30 mm projectiles, but protection can be enhanced with add-ons or composite armour.

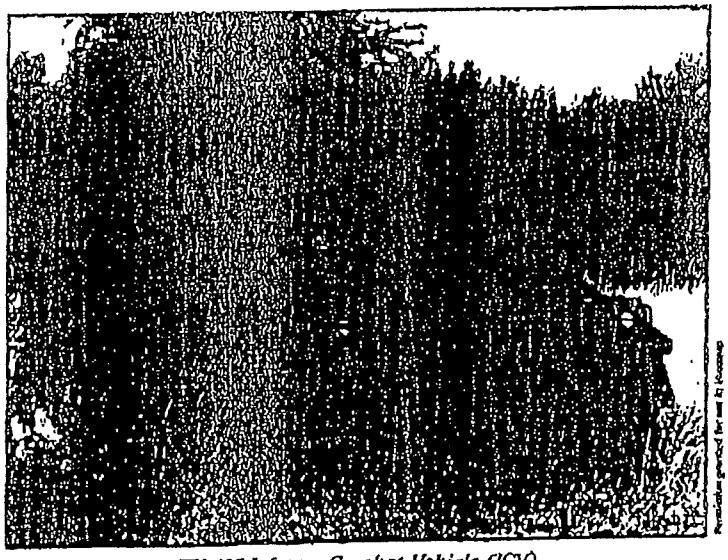
According to the company, the vehicle also has a low signature radar, low noise level, day and night sight engagers, a laser rangefinder and a thermal imager.

Svante Andersson, Hagglund's liaison officer in Canada, says the company is very involved with the APC project. "We have a very competitive product with the CV90. We've been working a bit with DND in answering questions on the CV90 and are also discussing the project with Canadian industry." Andersson say the CV90 would likely be built in Canada under license.

TH495 Infantry Combat Vehicle

Manufacturer: Thyssen Henschel GmbH, Kassel, Germany

The TH495 is a full-tracked vehicle developed by Thyssen Henschel and introduced in first prototype in 1992. Greg Alford of Thyssen BHI in Ottawa states that the TH495 is a market-driven design that meets the needs of NATO and other nations that wish to maintain general purpose armed forces, with multi-purpose combat capabilities. The baseline vehicle has been designed for adaption to a variety of light armour roles and for future growth potential. The vehicle has a modular design top plate which permits adaptation for a variety of turrets.



TH 495 Infantry Combat Vehicle (ICV)

Thyssen conducted a comprehensive market survey before proceeding with a tracked design intended to offer high protection and payload with no compromise on mobility.

The TH495 ICV (Infantry Combat Vehicle) variant has space for two crew - commander and driver - and up to eight infantry in the rear. Vision for the driver is provided by three periscopes, with the middle one being replaced by an image intensifier for night driving. In addition, hull-mounted video cameras enable the soldiers to monitor the battlefield from inside the crew compartment while the hatches are closed.

The TH495 ICV has a combat weight of 21.6 tonnes and a power-to-weight ratio of 24.3 hp/tonne. It has a five-road wheel configuration and an overall length of 235 in. Thyssen Henschel has also produced a slightly longer six-road wheel prototype with additional internal capacity and a 30-mm cannon turreted configuration.

The basic vehicle hull is all-welded steel armour construction. In addition, a layer of modular spaced steel and composite armour panels are fitted to the hull with quick-fit bolts. These modules can be dismounted for C130 transport (reducing the vehicle weight to 17.5 tonnes) or can be adjusted in the field for increased security. Thyssen advises that this concept was developed to enable the customer to update protection with the latest technology without the need for workshop refit, or to replace battle-damaged segments. Spaced armour has also been fitted to the top of the hull to protect against vertical attack.

Alford states that another significant feature is the 495's digital electronic bus system. This allows electronic components to be introduced, or replaced, by plugging-in to the bus, rather than rewiring the entire vehicle system.

The TH495 is a very recent development and has not as yet received purchase orders. The Company advises that it has furnished an ICV prototype to Malaysia for extensive trials with the Malaysian army. ★

FEATURE ARTICLE

Bosnia: How Our Troops View Their Equipment

By George Koch

During a two-week visit to Canada's peacekeeping battalions in Croatia and Bosnia last September, VANGUARD *contributor George Koch of Calgary spoke to dozens of Canadian peacekeepers of all ranks about the amount, range and [illegible] their equipment. Many offered candid opinions in return for not using their names.*

What follows is his personal synthesis of the troops' view of their own equipment:

With the end of the Cold War ironically also ending the era of "classical" peacekeeping, the equipment shortages and gaps facing Canada's army in the new era of muscular peacemaking and humanitarian-relief-under-fire are more acute than ever. Bosnia is a prime example.

Lest anyone harbour lingering doubts, the former Yugoslavia is one of the most militarized regions on earth. The late Josip Broz Tito built up a society in which virtually every man was trained as a soldier.

Fearing a Soviet invasion and a reversion to partisan warfare, Tito oversaw dispersal of the Yugoslav military-industrial complex and the construction of literally hundreds of [illegible]ches throughout the country. As many Canadian troops have noted, nobody has ever truly subdued the South Slavs—not the Turks, not the Nazis and not the Soviets. It certainly won't be the UN.

These arms caches are now in the hands of the half-dozen factions at war in Croatia and Bosnia. The armies number some 375,000 men and women under arms, not counting the huge Yugoslav National Army watching from Serbia.

The various armies deploy every kind of heavy weapon imaginable, including many anti-vehicle systems, from heavy machine guns to rapid-fire cannons to tanks to attack helicopters to area-denial weapons like multiple-launch rocket systems containing cluster munitions.

In CanBat2's Area of Responsibility (AOR) alone the parties have sown 600,000 mines.

Indeed, CanBat2's camp at Visoko adjoins a Bosnian-Muslim factory fabricating multi-barrelled rocket launchers.

The 70,000-strong Bosnian Serb Army alone, for instance, deploys some 300 tanks and 700 artillery pieces. The 50,000-strong Croatian regular army is described by a senior UN intelligence officer as "close to Western standards." Last year, it was conducting brigade-level combined-arms exercises involving attack helicopters, parachutists, tanks and landing craft.

Equipment and Gear

And despite the UN embargo, more arms are flowing into this vast Balkan armoury, say UN officers, "by the ton."

Canadian peacekeepers are about as well-equipped as it's possible to be in the Canadian army. In many cases, though, the apparent plenty comes from the limited inventories in the Canadian army of everything from heavy machine guns to thermal imaging observation devices being scoured from units all over Canada and sent overseas.

When one peacekeeping battalion rotates out after its six-month deployment, it simply leaves all the equipment for the next contingent.

If Canada were to deploy a larger force on a multilateral peacemaking mission, as envisioned in the recent Defence White Paper, the troops would find themselves with severe shortages of everything from night-vision gear to anti-armour weapons to heavy machine guns.

To start with the good news, the infantry now has a sound family of small arms. Along with mobility and communications, small arms are of course the crucial aspect for peacekeeping.

The ancient, worn out, 9 mm Browning No. 2 Mk I officer's pistol, according to many I spoke to, is a joke. Some were used by Chiang Kai-shek's Nationalists in the 1940s and still bear some Chinese markings. But the key weapon to the infantry is the assault rifle, and in this regard, most troops in Bosnia and Croatia consider their C7 the best such weapon in the Balkans.

The late-80s Diemaco design and production has purged the bugs of the old U.S. M-16. The lightness and compactness of both weapon and ammunition are important assets in cramped little "Jeeps" and M113 Armoured Personnel Carriers, as well as for extended foot patrols in the various separation zones overseen by Canadian peacekeepers.

Soldiers I spoke with are particularly delighted with the rugged, three-power optical sight of the C7A1.

acquired only in 1993. Though it's sometimes laughed at by troops from some other countries, Canadian soldiers told me it's extended the accurate firing range from 300 to 500 metres, although the bullet's stopping power at that range is marginal.

They also like new metal 30-round clips; so much so that many soldiers I met had up to six magazines jammed into their flak jackets.

The 5.56 mm, Belgian-built Minimi C9 Light Machine Gun (the U.S. Army calls it the M249) is very popular too. Using the same ammunition and optical sight as the C7, the C9 gives each section two easily carried weapons that can be fired at full auto for sustained periods using the 200-round canister attached to the weapon's underside.

Surprisingly, the troops speak with particular warmth towards the old but extremely accurate and reliable 7.62 mm C6 General Purpose Machine Gun. "I can put a single bullet exactly where I want it out to 1800 metres," boasted one soldier.

The far older Browning .50-cal Heavy Machine Gun, acquired in 942, is also favoured, but with only 1,600 in the entire army, there are never enough of them for the numerous requirements of vehicles, Observation Posts (OPs) and training.

Almost as important for sustained deployments are mundane-sounding equipment items that help keep soldiers fit, alert and fully functional, items like flak jackets, kevlar helmets, Gore-tex raingear and new, light desert-type boots.

In this regard, there appeared to me to be shortages even for the limited number of troops deployed to Croatia and Bosnia.

I saw old steel helmets hung from pegs in the camps. And some kevlar helmets had been painted blue with a type of paint that softens the helmet's material.

Some flak jackets were fraying and coming apart at the fabric connections, allowing gaps in the jacket's coverage to appear.

Some front-line troops wear personally purchased civilian raingear under their leaky old regulation gear. Canadians gawk enviously at the new Swedish camo pants made from a material that is water-repellant and resists both chemicals and fire.

OPs

For the crucial peacekeeping function of observation, the field-deployed troops are in reasonably good shape. The first priority, rapidly erecting some form of protection, has been solved by the unique, British-designed Hesco Bastion. This consists of hinged surfaces of heavy steel mesh which can be folded and stacked for easy transport, then unfolded and hooked together in minutes.

Once backed by fabric, it is then filled by front-end loader with whatever material is available—sand, dirt or rubble.

A basic OP for a section of troops can be thrown together in one day flat. Hesco Bastion units stacked two high and two deep can withstand almost all small arms, light cannon and RPG rounds, and all but direct hits from tanks or artillery. OPs are then completed with timber-and-sandbag observation and firing platforms and ringed with razor wire.

Night Vision

For observation, the assemblage of night-vision equipment is quite good.

Starlight goggles provide mobile, personal night vision, although the largest number I saw at any OP was two. If that is the regular issue, it seems impossible for an entire section to operate so equipped.

Similarly, most OPs also had one or two passive light-amplifying scopes for C7s and C9s.

For maximum night observation, most OPs had a single, tripod-mounted Night Observation Device, Long-Range (NODLR) thermal imaging observation and ranging device. The eight-power NODLR clearly identifies vehicles and humans at distances up to 2000 metres. Its only drawback is the noise from its cooling system, which makes silent observation and listening difficult.

The principal shortcoming in night vision is the lack of a mobile, vehicle-mounted thermal imager. CanBatt in Croatia was using its Tow Under Armour (TUA) vehicles to conduct roving night patrols in the demilitarized Zone of Separation that keeps the Croatian Army (HV) away from the Army of the Republic of Serb Krajina (ARSK) occupying the Serb-populated region of Croatia.

While highly effective at deterring and halting armed incursions by both sides, and at times even breaking up fire fights, the necessity of using the battalion's highest-value single asset, the TUA, mounted on its least-reliable platform, the M113, starkly demonstrates to me the equipment shortage.

Transport

In the '90s, it seems to many of our soldiers, there shouldn't be an armoured vehicle moving without a thermal imaging sight. Detachable ones for observation use by trucks and jeeps should also form part of the peacekeeping inventory.

Like observation equipment, the army's vehicle scene is a mixed bag, though a decidedly more frayed one. The army's decision to retain the 2,848 1976-model-year, civilian Chevrolet 5/4 pickup truck and replace the original Jeep with the VW-designed Iltis 1/4-tonne 4X4 is a sore point with many troops I met.

Had the army bought the American Hummer, soldiers told me, it would have replaced two vehicles, eliminated gasoline from the army's supply train, save for tiny supplies for staff cars and portable electrical generators, and vastly enhanced tactical mobility.

The Hummer can carry an entire section and can be had in mortar, anti-tank and anti-aircraft versions.

The army had contracted Bombardier Inc. to build 1,900 and then an additional 600 Iltis vehicles, which carry only four troops and are powered by a rather anaemic 4 cylinder gasoline engine, for $26,700 apiece.

While some troops like the lltis' lightness and quickness for carrying ...d officers, many infantiers see it ... a stopgap that robs them of effectiveness. Some lltis vehicles, with just 60,000 km on the odometer, have reportedly had two and even three engine rebuilds.

Ironically—or maybe understandably—supply units are better-equipped in the vehicle department than the front-line troops.

Controversy continues to dog the Italian-designed, Western Star-built light truck, which, I gather, failed its initial tests and I was told repeatedly had standards lowered so it could pass re-trials.

As well, the ancient-looking ML trucks, built in the 1980s by Bombardier Inc., are viewed today as barely adequate—both marginally powered and relatively unreliable.

But the supply troops love their Steyr-designed HVLW trucks, built by UTDC in Kingston. With eight forward speeds, all-wheel drive and an auto-... torque converter allowing ...less starts and uphill hauling in higher gears, the "HL" proved a formidable beast on the muddy, winding roads of Bosnia.

Last winter, when one road was closed due to snows, the Canadians simply blasted through in the HL.

The 15-tonne Kenworth seems to have other challenges. With six enormous wheels and a huge engine, the big vehicle is fine for long hauls on wider North American roads. Its palletized self-loading system allows extremely rapid turn-arounds, with troops at each end taking all the time they need to load and unload cheap, easily replaceable sea containers.

But the Kenworth's vast turning radius has proved problematic in Bosnia, requiring repeated backing on hairpins, slowing convoys considerably.

Hard Skinned Vehicles

The biggest concern, of course, is the ( ) the army's armoured vehicles, and in this department, concerns raised in the mainstream news media are, if anything, I think understated, judging from soldiers I met in Bosnia.

Worst off is the 29-year-old M113A2. The Forces have 1,000 of them.

In Bosnia, troops ride in constant fear; some infantiers I met say they would rather be out in the open than in what they consider an aluminum coffin.

The "tracks" are notoriously underpowered, with their 215-hp rated diesel, which after numerous rebuilds puts out far less power in reality. The M113s, especially loaded down with sandbags on the topsides for protection from snipers and rock-throwing children, blast curtains on the floors for minimal protection against mines, extra ammunition, food and water, and light anti-tank weapons, are too slow to escort convoys.

They grind up steeper hills literally at a snail's pace. Fire support, with a manually traversed .50-cal HMG, now finally protected by a steel shield, is two generations out of date.

Breakdowns are frequent and maintenance is heavy. CanBat2 in Bosnia, a force of less than 800, had more than 100 personnel devoted to first- and second-line vehicle maintenance (plus more personnel doing heavier work). CanBat1's TUA Platoon, the battalion's most valuable single asset, had five of its eight tracked vehicles experience serious break-downs over a six-month deployment.

Every camp I saw in Croatia, in fact, had tracks sitting around in various states of disrepair.

Even the M113's Commander/HMG shield program, carried out on-site last year, I gather was not universally supported. The 1PPCLI of CanBat1 apparently found the shields slowed down the HMG's traverse so much that they promptly removed them and took their chances with old plate shields. A crash up-armour program for the M113s was underway on-site at CanBat1's camp in Croatia in September and October (see sidebar).

The six-wheeled Cougar tank trainer, on the other hand, won new respect in Bosnia from the very armoured troops who most held it in contempt back home in Canada as a patronizing substitute for real tanks. Fast, smooth and reliable, able to escort wheeled convoys and provide rapid tactical mobility to fire teams of infantiers, the Cougar, used by CanBat2 only, proved quite an effective peacekeeping vehicle.

Its 76 mm gun—while obviously unusable in high-intensity conflict, and reduced in effectiveness by its obsolete optical sight and non-stabilized turret—was in fact a potent weapon in the local context, where all heavy weapons are viewed with respect. The 76's HESH round, in fact, is believed able to knock out any vehicle deployed by local armies out to about 2000 metres.

The Cougar was also due to receive add-on armour over this winter, which it should be able to handle without a great reduction in mobility, as it is easily able to accelerate to 80 km/h on pavement and has adequate hill-climbing power.

"At first, I thought I'd need more firepower," said one armoured officer. "But lots of places we've got OPs, I couldn't take a tank. The Cougars gave us what we needed - mobility and reasonable protection from fragments and good firepower."

The Cougar's experience in Bosnia, however, I think proves that wheeled vehicles are a complement to rather than a substitute for tracked vehicles. For example, in autumn tests during rainy periods, the Cougar was unable to reach the more remote OPs, bogging down in the slick Bosnian mud and sliding uncontrollably down the rutted tracks. Chains helped but did not eliminate this problem.

So, extractions under fire from remote OPs would have had to occur on foot or await evacuation by M113. While CanBat2 was eagerly awaiting arrival of the Grizzlies previously deployed to the reserves, with its MG turret that's electrically driven and equipped with a night sight, the Cougar's peacekeeping record—excellent for some applications, unusable for others—I think proves

the army needs a well-armoured, fast tracked vehicle with reasonable fire ...rt—even for peacekeeping.

Mines

For the combat engineers stationed with both battalions, the problem is more one of manpower than equipment.

Canada apparently is down to 600 combat engineers, at a time when demands for mine-clearing throughout the world are at an all-time high. Engineers were also constantly tasked building OPs and constructing dirt roads to bypass roads blocked by Serb forces.

In Croatia, engineers from 1 CER at Chilliwack worked 12-hour days for six months, clearing a total of 500 km of roads and lifting some 1200 mines. The cost: one dead, five wounded.

Cleared mines, deemed not to be weapons by the UN, had to be returned to the local factions. "It was a bitter pill to swallow," said one engineer. "We know they'll be used ...us again."

...l, newer equipment would speed the current process, which to ...e seemed to rely more on deducing where mines are likely to be, then probing manually.

In fact, many anti-vehicle mines ...e triple-stacked with a single detonator containing less than a gram of metal up to two feet below the surface, hence all-but undetectable. The most promising new technologies, I ...ther, are dogs trained to smell the ...drocarbon molecules that all ...ines emit, and the new robotized ...ine detection vehicle.

Dubbed JINGOSS and currently ...ing tested at Suffield, the six-...eeled, low-ground-pressure JIN-...SS would detect mines and ...ray-paint a marking on the ground, ...stly reducing both the acute dan-... and the stress level afflicting the ...gineers.

The state and availability of ...avy weapons is of equally great ... although the efficacy of ...d... heavy weapons to Croatia ...d Bosnia is hotly contested, even ...ong defence hawks.

Heavy Weapons

Some say heavy weapons would be needlessly provocative and serve no useful function. On the other hand, the Nordic battalion's use - and firing - of its Leopard 1 tanks in Bosnia last year is well-known. Canada's own Leopard 1s, while considered obsolescent, are in fine shape and would be a formidable weapon in the Balkans, where older, Soviet-designed tanks like the T34, T55 and T64 far outnumber the newer Yugoslav M84 (a T72 knock-off).

Cleared mines, deemed not to be weapons by the UN, had to be returned to the local factions.

Less-publicized is the marked effect Canada's TUAs have had on locals. Both CanBats last summer conducted live firings against old tanks with local observers present. The effects - most targets demolished on first round at 2550 metres - were not lost on the locals. To the macho, blustery Serbs, who have grown accustomed to total superiority in heavy weapons and generally consider Westerners soft and weak, this was a form of sabre-rattling that won the Canadians new respect.

CanBat2 in Bosnia deployed several TUAs on the Visoko-Kiseljak road, which runs up a valley directly beneath Serb and Muslim positions and is known as "sniper alley." CanBat 2 kept the rest in reserve for emergencies.

CanBat1 in Croatia, however, made much more aggressive use of their eight TUAs, which are now equipped with the 71E missile, which can defeat even explosive reactive armour.

Two TUAs were constantly placed behind rubble revetments just outside the battalion's main Camp Rastevic. Their launchers were pointed at the entrance to a UN-supervised Serb heavy weapons collection compound at Benkovac that contains some 60 tanks and 100 artillery pieces. The rest were stationed at a small camp near the Zone of Separation, where they were used to conduct nightly patrols.

Both battalions deployed mortars, but the heaviest is the C3 81 mm mortar. Neither CanBat has anything to match the locally used 120 mm heavy mortars, or their infantry anti-tank weapons.

Canada deploys the tiny, throw-away M72s plus the aging, 84 mm L14A1 Carl Gustav anti-tank tube. But at one OP between Visoko and Ilijas, manned jointly by Canadians and Serbs, the Serbs had a lethal, modern, Soviet-designed 90 mm tank-busting tube propped casually against a wall. The Canadians will feel a good deal more secure once the Eryx short-range anti-tank rocket is acquired and deployed to the Balkans.

Because the war in Bosnia and Croatia is, for the UN peacekeepers, so much a war of nerves, with layer upon layer of bluff, threat and deterrence, the Canadians' biggest worry I heard is the government's refusal to provide truly heavy back-up should things go wrong.

Many troops think Canada should have deployed tanks in-theatre for even more visible and credible deterrence than the TUA's provide, not to mention as a last-resort for rapid, emergency mine-clearing.

Equally important, they say, would be stationing heavy artillery and CF-18 fighters to provide ultimate support should the entire UNPROFOR mission fall apart. As of last December, that eventuality had shifted from unlikely contingency to very real probability in the space of just six weeks.

If Canada's legendary goodwill proves insufficient to fulfil its mission and protect its troops, the country may have to rely ignominiously on the heavy weapons of other countries—and be dependent on their willingness

to use them - to get its troops out of harm's way.

In this less-than-lovely New World Order I think Canada either has to re-equip its army with modern armoured vehicles and a host of lesser items like mine-clearing equipment - or clear out of the way and let countries willing to back their rhetoric with dollars and equipment do the work. Ten Canadians so far have been killed in Bosnia and Croatia. ★

SIDEBAR

APC Armour Program Offers Better Protection

In a jerry-rigged shelter in the middle of the rubble moonscape known as Camp Rastevic in Croatia, a 15-man team from DEW Engineering and Development Ltd. of Ottawa is bolting and gluing new armour to the outside and inside of a sanded-down M113 Armoured Personnel Carrier. It's a crash program designed to mitigate the horrible effects of mine blasts that the troops of 1PPCLI have experienced while clearing mines in and patrolling parts of the Serb-held Krajina region of Croatia.

The exact specifications of the new, German-designed composite armour are secret. It is meant to provide ballistic protection well beyond the M113's aluminum wall's bare ability to withstand 7.62 mm rounds - definitely up to HMG rounds and possibly light cannon at longer ranges. The outer layers, roughly 1 inch thick, provide the main protection. It is designed to withstand blasts or, for larger munitions, shatter to dissipate energy. Damaged panels can be field-replaced.

The lighter, inner layer, is about 1/2 inch thick and contains some kevlar. It is meant to reduce the spall cone of rounds that do penetrate to an arc of 15 degrees, thus considerably reducing injury from single-round hits of light cannon fire or rocket-propelled grenade rounds to the troops inside. DEW also offers a mine kit for the M113's undersides.

The whole program adds about 800 kg in weight to the already marginally powered M113. Field trials detected only a marginal reduction in acceleration and hill-climbing ability. But this was reportedly using the battalion's best M113 containing none of the usual ad hoc field equipment. The engineer's M113s only manage 25 km/h and will barely be able to stand the extra weight.

In any case, the fact that DEW was not equipping CanBat1's high-value Tow Under Armour vehicles due to weight problems I think shows that even the modest weight of this program seems to hurt the M113's mobility.

The barely adequate protection the "enhanced" M113 will offer also demonstrates the crying need for either a new tracked infantry fighting vehicle or a complete rebuild of the M113 to the A3 specification as currently being done by the U.S. Army and offered for Canada by DEW.

Please Note Page 24, 26

ARTICLE

Bosnia: How Our Troops View Their Equipment

By George Koch

During a two-week visit to Canada's peacekeeping battalions in Croatia and Bosnia last September, VANGUARD *contributor George Koch of Calgary spoke to dozens of Canadian peacekeepers of all ranks about the amount, range and state of their equipment. Many offered candid opinions in return for not using their names.*

What follows is his personal synthesis of the troops' view of their own equipment:

With the end of the Cold War ironically also ending the era of "classical" peacekeeping, the equipment shortages and gaps facing Canada's army in the new era of muscular peacemaking and humanitarian-relief-under-fire are more acute than ever. Bosnia is a prime example.

Lest anyone harbour lingering doubts, the former Yugoslavia is one of the most militarized regions on earth. The late Josip Broz Tito built up a society in which virtually every man was trained as a soldier.

Fearing a Soviet invasion and a reversion to partisan warfare, Tito oversaw dispersal of the Yugoslav military-industrial complex and the construction of literally hundreds of arms caches throughout the country.

As many Canadian troops have said, nobody has ever truly subdued the South Slavs—not the Turks, not the Nazis and not the Soviets. It certainly won't be the UN.

These arms caches are now in the hands of the half-dozen factions at war in Croatia and Bosnia. The armies number some 375,000 men and women under arms, not counting the huge Yugoslav National Army watching from Serbia.

The various armies deploy every kind of heavy weapon imaginable, including many anti-vehicle systems, from heavy machine guns to rapid-fire cannons to tanks to attack helicopters to area-denial weapons like multiple-launch rocket systems containing cluster munitions.

In CanBat1's Area of Responsibility (AOR) alone the parties have sown 600,000 mines.

Indeed, CanBat2's camp at Visoko adjoins a Bosnian-Muslim factory fabricating multi-barrelled rocket launchers.

The 70,000-strong Bosnian Serb Army alone, for instance, deploys some 300 tanks and 700 artillery pieces. The 50,000-strong Croatian regular army is described by a senior UN intelligence officer as "close to Western standards." Last year, it was conducting brigade-level combined-arms exercises involving attack helicopters, parachutists, tanks and landing craft.

Equipment and Gear

And despite the UN embargo, more arms are flowing into this vast Balkan armoury, say UN officers, "by the ton."

Canadian peacekeepers are about as well-equipped as it's possible to be in the Canadian army. In many cases, though, the apparent plenty comes from the limited inventories in the Canadian army of everything from heavy machine guns to thermal imaging observation devices being scoured from units all over Canada and sent overseas.

When one peacekeeping battalion rotates out after its six-month deployment, it simply leaves all the equipment for the next contingent.

If Canada were to deploy a larger force on a multilateral peacemaking mission, as envisioned in the recent Defence White Paper, the troops would find themselves with severe shortages of everything from night-vision gear to anti-armour weapons to heavy machine guns.

To start with the good news, the infantry now has a sound family of small arms. Along with mobility and communications, small arms are of course the crucial aspect for peacekeeping.

The ancient, worn out, 9 mm Browning No. 2 Mk 1 officer's pistol, according to many I spoke to, is a joke. Some were used by Chiang Kai-shek's Nationalists in the 1940s and still bear some Chinese markings. But the key weapon to the infantry is the assault rifle, and in this regard, most troops in Bosnia and Croatia consider their C7 the best such weapon in the Balkans.

The late-80s Diemaco design and production has purged the bugs of the old U.S. M-16. The lightness and compactness of both weapon and ammunition are important assets in cramped little "Jeeps" and M113 Armoured Personnel Carriers, as well as for extended foot patrols in the various separation zones overseen by Canadian peacekeepers.

Soldiers I spoke with are particularly delighted with the rugged, three-power optical sight of the C7A1,

acquired only in 1993. Though it's sometimes laughed at by troops from some other countries, Canadian soldiers told me it's extended the accurate firing range from 300 to 500 metres, although the bullet's stopping power at that range is marginal.

They also like new metal 30-round clips; so much so that many soldiers I met had up to six magazines jammed into their flak jackets.

The 5.56 mm, Belgian-built Minimi C9 Light Machine Gun (the U.S. Army calls it the M249) is very popular too. Using the same ammunition and optical sight as the C7, the C9 gives each section two easily carried weapons that can be fired at full auto for sustained periods using the 200-round canister attached to the weapon's underside.

Surprisingly, the troops speak with particular warmth towards the old but extremely accurate and reliable 7.62 mm C6 General Purpose Machine Gun. "I can put a single bullet exactly where I want it out to 1800 metres," boasted one soldier.

The far older Browning .50-cal Heavy Machine Gun, acquired in 1942, is also favoured, but with only 1,600 in the entire army, there are never enough of them for the numerous requirements of vehicles, Observation Posts (OPs) and training.

Almost as important for sustained deployments are mundane-sounding equipment items that help keep soldiers fit, alert and fully functional. Items like flak jackets, kevlar helmets, Gore-tex raingear and new, light desert-type boots.

In this regard, there appeared to me to be shortages even for the limited number of troops deployed to Croatia and Bosnia.

I saw old steel helmets hung from pegs in the camps. And some kevlar helmets had been painted blue with a type of paint that softens the helmet's material.

Some flak jackets were fraying and coming apart at the fabric connections, allowing gaps in the jacket's coverage to appear.

Some front-line troops wear personally purchased civilian raingear under their leaky old regulation gear. Canadians gawk enviously at the new Swedish camo pants made from a material that is water-repellant and resists both chemicals and fire.

OPs

For the crucial peacekeeping function of observation, the field-deployed troops are in reasonably good shape. The first priority, rapidly erecting some form of protection, has been solved by the unique, British-designed Hesco Bastion. This consists of hinged surfaces of heavy steel mesh which can be folded and stacked for easy transport, then unfolded and hooked together in minutes.

Once backed by fabric, it is then filled by front-end loader with whatever material is available—sand, dirt or rubble.

A basic OP for a section of troops can be thrown together in one day flat. Hesco Bastion units stacked two high and two deep can withstand almost all small arms, light cannon and RPG rounds, and all but direct hits from tanks or artillery. OPs are then completed with timber-and-sandbag observation and firing platforms and ringed with razor wire.

Night Vision

For observation, the assemblage of night-vision equipment is quite good.

Starlight goggles provide mobile, personal night vision, although the largest number I saw at any OP was two. If that is the regular issue, it seems impossible for an entire section to operate so equipped.

Similarly, most OPs also had one or two passive light-amplifying scopes for C7s and C9s.

For maximum night observation, most OPs had a single, tripod-mounted Night Observation Device, Long-Range (NODLR) thermal imaging observation and ranging device. The eight-power NODLR clearly identifies vehicles and humans at distances up to 2000 metres. Its only drawback is the noise from its cooling system, which makes silent observation and listening difficult.

The principal shortcoming in night vision is the lack of a mobile, vehicle-mounted thermal imager. CanBat I in Croatia was using its Tow Under Armour (TUA) vehicles to conduct roving night patrols in the demilitarized Zone of Separation that keeps the Croatian Army (HV) away from the Army of the Republic of Serb Krajina (ARSK) occupying the Serb-populated region of Croatia.

While highly effective at deterring and halting armed incursions by both sides, and at times even breaking up fire fights, the necessity of using the battalion's highest-value single asset, the TUA, mounted on its least-reliable platform, the M113, starkly demonstrates to me the equipment shortage.

Transport

In the '90s, it seems to many of our soldiers, there shouldn't be an armoured vehicle moving without a thermal imaging sight. Detachable ones for observation use by trucks and jeeps should also form part of the peacekeeping inventory.

Like observation equipment, the army's vehicle scene is a mixed bag, though a decidedly more frayed one. The army's decision to retain the 2,848 1976-model-year, civilian Chevrolet 5/4 pickup truck and replace the original Jeep with the VW-designed Iltis 1/4-tonne 4X4 is a sore point with many troops I met.

Had the army bought the American Hummer, soldiers told me, it would have replaced two vehicles, eliminated gasoline from the army's supply train, save for tiny supplies for staff cars and portable electrical generators, and vastly enhanced tactical mobility.

The Hummer can carry an entire section and can be had in mortar, anti-tank and anti-aircraft versions.

The army had contracted Bombardier Inc. to build 1,900 and then an additional 600 Iltis vehicles, which carry only four troops and are powered by a rather anaemic 4 cylinder gasoline engine, for $26,700 apiece.

While some troops like the lltis' lightness and quickness for carrying around officers, many infantiers see it as a stopgap that robs them of effectiveness. Some lltis vehicles, with just 60,000 km on the odometer, have reportedly had two and even three engine rebuilds.

Ironically—or maybe understandably—supply units are better-equipped in the vehicle department than the front-line troops.

Controversy continues to dog the Italian-designed, Western Star-built light truck, which, I gather, failed its initial tests and I was told repeatedly had standards lowered so it could pass re-trials.

As well, the ancient-looking ML trucks, built in the 1980s by Bombardier Inc., are viewed today as barely adequate—both marginally powered and relatively unreliable.

But the supply troops love their Steyr-designed HVLW trucks, built by UTDC in Kingston. With eight forward speeds, all-wheel drive and an automatic torque converter allowing clutch-less starts and uphill hauling in higher gears, the "HL" proved a formidable beast on the muddy, winding roads of Bosnia.

Last winter, when one road was closed due to snows, the Canadians simply blasted through in the HL.

The 15-tonne Kenworth seems to have other challenges. With six enormous wheels and a huge engine, the big vehicle is fine for long hauls on wider North American roads. Its palletized self-loading system allows extremely rapid turn-arounds, with troops at each end taking all the time they need to load and unload cheap, easily replaceable sea containers.

But the Kenworth's vast turning radius has proved problematic in Bosnia, requiring repeated backing on hairpins, slowing convoys considerably.

Hard Skinned Vehicles

The biggest concern, of course, is the age of the army's armoured vehicles, and in this department, concerns raised in the mainstream news media are, if anything, I think understated, judging from soldiers I met in Bosnia.

Worst off is the 29-year-old M113A2. The Forces have 1,000 of them.

In Bosnia, troops ride in constant fear: some infantiers I met say they would rather be out in the open than in what they consider an aluminum coffin.

The "tracks" are notoriously underpowered, with their 215-hp rated diesel, which after numerous rebuilds puts out far less power in reality. The M113s, especially loaded down with sandbags on the topsides for protection from snipers and rock-throwing children, blast curtains on the floors for minimal protection against mines, extra ammunition, food and water, and light anti-tank weapons, are too slow to escort convoys.

They grind up steeper hills literally at a snail's pace. Fire support, with a manually traversed .50-cal HMG, now finally protected by a steel shield, is two generations out of date.

Breakdowns are frequent and maintenance is heavy. CanBat2 in Bosnia, a force of less than 800, had more than 100 personnel devoted to first- and second-line vehicle maintenance (plus more personnel doing heavier work). CanBat1's TUA Platoon, the battalion's most valuable single asset, had five of its eight tracked vehicles experience serious break-downs over a six-month deployment.

Every camp I saw in Croatia, in fact, had tracks sitting around in various states of disrepair.

Even the M113's Commander/HMG shield program, carried out on-site last year, I gather was not universally supported. The IPPCLI of CanBat1 apparently found the shields slowed down the HMG's traverse so much that they promptly removed them and took their chances with old plate shields. A crash up-armour program for the M113s was underway on-site at CanBat1's camp in Croatia in September and October (see sidebar).

The six-wheeled Cougar tank trainer, on the other hand, won new respect in Bosnia from the very armoured troops who most held it in contempt back home in Canada as a patronizing substitute for real tanks. Fast, smooth and reliable, able to escort wheeled convoys and provide rapid tactical mobility to fire teams of infantiers, the Cougar, used by CanBat2 only, proved quite an effective peacekeeping vehicle.

Its 76 mm gun—while obviously unusable in high-intensity conflict, and reduced in effectiveness by its obsolete optical sight and non-stabilized turret—was in fact a potent weapon in the local context, where all heavy weapons are viewed with respect. The 76's HESH round, in fact, is believed able to knock out any vehicle deployed by local armies out to about 2000 metres.

The Cougar was also due to receive add-on armour over this winter, which it should be able to handle without a great reduction in mobility, as it is easily able to accelerate to 80 km/h on pavement and has adequate hill-climbing power.

"At first, I thought I'd need more firepower," said one armoured officer. "But lots of places we've got OPs, I couldn't take a tank. The Cougars gave us what we needed - mobility and reasonable protection from fragments and good firepower."

The Cougar's experience in Bosnia, however, I think proves that wheeled vehicles are a complement to rather than a substitute for tracked vehicles. For example, in autumn tests during rainy periods, the Cougar was unable to reach the more remote OPs, bogging down in the slick Bosnian mud and sliding uncontrollably down the rutted tracks. Chains helped but did not eliminate this problem.

So, extractions under fire from remote OPs would have had to occur on foot or await evacuation by M113. While CanBat2 was eagerly awaiting arrival of the Grizzlies previously deployed to the reserves, with its MG turret that's electrically driven and equipped with a night sight, the Cougar's peacekeeping record—excellent for some applications, unusable for others—I think proves

→ to 26

the army needs a well-armoured, fast tracked vehicle with reasonable fire support—even for peacekeeping.

Mines

For the combat engineers stationed with both battalions, the problem is more one of manpower than equipment.

Canada apparently is down to 600 combat engineers, at a time when demands for mine-clearing throughout the world are at an all-time high. Engineers were also constantly tasked building OPs and constructing dirt roads to bypass roads blocked by Serb forces.

In Croatia, engineers from 1 CER at Chilliwack worked 12-hour days for six months, clearing a total of 600 km of roads and lifting some 1200 mines. The cost: one dead, five wounded.

Cleared mines, deemed not to be weapons by the UN, had to be returned to the local factions. "It was a bitter pill to swallow," said one engineer. "We know they'll be used against us again."

Still, newer equipment would speed the current process, which to me seemed to rely more on deducing where mines are likely to be, then probing manually.

In fact, many anti-vehicle mines are triple-stacked with a single detonator containing less than a gram of metal up to two feet below the surface, hence all-but undetectable. The most promising new technologies, I gather, are dogs trained to smell the hydrocarbon molecules that all mines emit, and the new robotized mine detection vehicle.

Dubbed JINGOSS and currently being tested at Suffield, the six-wheeled, low-ground-pressure JINGOSS would detect mines and spray-paint a marking on the ground, vastly reducing both the acute danger and the stress level afflicting the engineers.

The state and availability of heavy weapons is of equally great concern, although the efficacy of ding heavy weapons to Croatia and Bosnia is hotly contested, even among defence hawks.

Heavy Weapons

Some say heavy weapons would be needlessly provocative and serve no useful function. On the other hand, the Nordic battalion's use - and firing - of its Leopard 1 tanks in Bosnia last year is well-known. Canada's own Leopard 1s, while considered obsolescent, are in fine shape and would be a formidable weapon in the Balkans, where older, Soviet-designed tanks like the T34, T55 and T64 far outnumber the newer Yugoslav M84 (a T72 knock-off)..

Cleared mines, deemed not to be weapons by the UN, had to be returned to the local factions.

Less-publicized is the marked effect Canada's TUAs have had on locals. Both CanBats last summer conducted live firings against old tanks with local observers present. The effects - most targets demolished on first round at 2550 metres - were not lost on the locals. To the macho, blustery Serbs, who have grown accustomed to total superiority in heavy weapons and generally consider Westerners soft and weak, this was a form of sabre-rattling that won the Canadians new respect.

CanBat2 in Bosnia deployed several TUAs on the Visoko-Kiseljak road, which runs up a valley directly beneath Serb and Muslim positions and is known as "sniper alley." CanBat 2 kept the rest in reserve for emergencies

CanBat1 in Croatia, however, made much more aggressive use of their eight TUAs, which are now equipped with the 71E missile, which can defeat even explosive reactive armour.

Two TUAs were constantly placed behind rubble revetments just outside the battalion's main Camp Rastevic. Their launchers were pointed at the entrance to a UN-supervised Serb heavy weapons collection compound at Benkovac that contains some 60 tanks and 100 artillery pieces. The rest were stationed at a small camp near the Zone of Separation, where they were used to conduct nightly patrols.

Both battalions deployed mortars, but the heaviest is the C3 81 mm mortar. Neither CanBat has anything to match the locally used 120 mm heavy mortars, or their infantry anti-tank weapons.

Canada deploys the tiny, throw-away M72s plus the aging, 84 mm L14A1 Carl Gustav anti-tank tube. But at one OP between Visoko and Ilijas, manned jointly by Canadians and Serbs, the Serbs had a lethal, modern, Soviet-designed 90 mm tank-busting tube propped casually against a wall. The Canadians will feel a good deal more secure once the Eryx short-range anti-tank rocket is acquired and deployed to the Balkans.

Because the war in Bosnia and Croatia is, for the UN peacekeepers, so much a war of nerves, with layer upon layer of bluff, threat and deterrence, the Canadians' biggest worry I heard is the government's refusal to provide truly heavy back-up should things go wrong.

Many troops think Canada should have deployed tanks in-theatre for even more visible and credible deterrence than the TUA's provide, not to mention as a last-resort for rapid, emergency mine-clearing.

Equally important, they say, would be stationing heavy artillery and CF-18 fighters to provide ultimate support should the entire UNPROFOR mission fall apart. As of last December, that eventuality had shifted from unlikely contingency to very real probability in the space of just six weeks.

If Canada's legendary goodwill proves insufficient to fulfil its mission and protect its troops, the country may have to rely ignominiously on the heavy weapons of other countries—and be dependent on their willingness

to use them - to get its troops out of harm's way.

In this less-than-lovely New World Order I think Canada either has to re-equip its army with modern armoured vehicles and a host of lesser items like mine-clearing equipment - or clear out of the way and let countries willing to back their rhetoric with dollars and equipment do the work. Ten Canadians so far have been killed in Bosnia and Croatia. ★